

**CLAIMS:**

1. A biopsy needle for sampling bone marrow tissue, comprising;  
a handle (2); and  
tissue sampling means (3) comprising a sampling tube with a bore (1) therein to receive a tissue sample,  
the outer surface of the sampling tube having an abrading formation (11) extending in an axial direction along the tube;  
characterized in that the abrading formation comprises a slot (11) cut into the wall of the sampling tube with at least one sharpened edge where the slot meets the outer wall of the sampling tube to abrade the sampled tissue, to permit the tip of the sampling tube to be laterally displaced whilst the tube is inserted into the bone marrow tissue.
2. A biopsy needle as claimed in claim 1 wherein both outer edges of the slot are sharpened.
3. A biopsy needle as claimed in claim 1 wherein the slot extends through the wall of the sampling tube.
4. A biopsy needle as claimed in claim 1 wherein the abrading formation comprises a plurality of slots spaced circumferentially on the sample tube.
5. A biopsy needle as claimed in claim 4 wherein the slots of the abrading formation do not extend to the end of the sampling tube tip.
6. A biopsy needle as claimed in claim 1 wherein a slot extends in an axial direction for at least 1 cm from the sampling tube tip.
7. A biopsy needle as claimed in claim 1 wherein the tissue sampling means further comprises a sample detacher (12) at the tip of the sampling tube to assist in detaching the base of the sample from adjoining tissue.

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8. A biopsy needle as claimed in claim 7 wherein the sample detacher comprises a slot (12) cut into the sampling tube tip wall.
9. A biopsy needle as claimed in claim 8 wherein the sample detacher slot (12) extends through the sampling tube tip wall.
10. A biopsy needle as claimed in claim 8 wherein the sample detacher comprises a plurality of sample detacher slots (12) spaced circumferentially spaced on the sample tube tip.
11. A biopsy needle as claimed in claim 8 wherein the or each sample detacher slot (12) has a length of between 1mm and 2mm.
12. A biopsy needle as claimed in claim 7 wherein at least a part of the sample detacher is disposed on the sampling tube substantially opposite at least a part of the abrading formation.
13. A biopsy needle as claimed in claim 1 further comprising stop means (9) to inhibit over-insertion of the sampling tube into the tissue being sampled.
14. A biopsy needle as claimed in claim 13 wherein at least a portion of the stop means is integrally formed with at least a portion of the handle.
15. A biopsy needle as claimed in claim 1 wherein the sampling tube bore extends through the handle.
16. A biopsy needle as claimed in claim 15 wherein the handle is adapted for connection of suction means to the sampling tube bore.
17. A biopsy needle as claimed in claim 15 further comprising coupling means (17) for coupling the needle to a motor drive (27) for rotation of the sampling tube.

18. A biopsy needle as claimed in claim 17 wherein the coupling means is separable from the needle and comprises a shaft adapted to be received by the sampling tube, a connecting portion (20) for connecting the motor drive and a drive portion (19) to engage with the handle.

19. A biopsy needle as claimed in claim 1 wherein the sampling tube has a sharpened, bevelled tip (10).

20. A combination of a biopsy needle for sampling bone marrow tissue and instructions showing a method for use of the needle, the biopsy needle comprising:  
a handle (2), and tissue sampling means (3) comprising a sampling tube with a bore (1) therein to receive a tissue sample, the outer surface of the sampling tube having an abrading formation (11) extending in an axial direction along the tube, for abrading the sampled tissue, to permit the sampling tube tip to be laterally displaced whilst the tube is inserted into the bone marrow tissue; the method comprising:  
inserting the sampling tube into the bone marrow tissue to be sampled;  
tilting and turning the sampling tube to assist in detaching a sample; and  
withdrawing the sampling tube with the sample therein.

21. A method of sampling a substance using a needle, the needle having a handle (2) and sampling means (3) comprising a sampling tip with a bore (1) therein to receive a sample of the substance, the sampling tip having a formation (11) on its outer surface for abrading the substance, the method comprising:

inserting the sampling tip into the substance to be sampled to collect a sample within its bore;

moving the sampling tip such that the substance is abraded to allow the sampling tip to be displaced sufficiently to weaken the connection between the sample and the bulk of the substance; and

withdrawing the sampling tip with the sample therein.

22. A biopsy needle for sampling bone marrow tissue, comprising:

tissue sampling means (3) comprising a sampling tube with a bore (1) therein to receive a tissue sample;

a handle (2) connected to the tissue sampling means for manual insertion of the biopsy needle; and

coupling means (17), detachably connected to the tissue sampling means, for coupling the needle to a rotary motor drive (27);

whereby the needle is adapted for both manual insertion and motor-assisted insertion.

23. A biopsy needle as claimed in claim 22 wherein an outer surface of the sampling tube is in contact with the sampled tissue and wherein the motor drive rotates at least said outer surface.

24. A biopsy needle as claimed in claim 22 further comprising stop means (9) to inhibit over-insertion of the sampling tube into the sampled tissue.

25. A biopsy needle as claimed in claim 24 wherein at least a portion of the stop means is integrally formed with at least a portion of the handle.

26. A biopsy needle as claimed in claim 22 wherein the coupling means is separable from the needle and comprises a shaft adapted to be received by the sampling tube, a connecting portion (20) for connecting the motor drive and a drive portion (19) to engage with the handle.

27. A biopsy needle as claimed in claim 22 further comprising a motor drive (27) and an insulating, sterile or sterilizable, protective sheath (28) to substantially enclose the motor drive except for a drive shaft, and to allow operation of the motor drive whilst within the sheath.

28. A coupling means for use with the biopsy needle of claim 22, comprising a shaft adapted to be received by the sampling tube of the biopsy needle, a connecting portion (20) for connecting the motor drive and a drive portion (19) to engage with the handle.

29. A biopsy needle assembly comprising:

an elongated tubular cannula, having an axially extending lumen therethrough and having distal and proximal ends,

a cannula handle attached to the proximal end of said cannula, said cannula handle extending transversely to the axis of said cannula and having a cavity aligned with and open to the proximal end of said cannula,

a distal end of said cannula which is bevelled and sharpened and in free fluid communication with the proximal end,

a recess or recesses on the outer surface of the said cannula distal end,

an expansion on the outer surface of the said cannula distal end,

an orifice in said cannula handle in fluid flow communication with said cannula lumen, said orifice being coaxial with said cannula lumen,

a stylet having a knob affixed to its proximal end, said knob sized to fit matingly within said orifice,

an elongated stylet shaft extending from said knob, slidably received within said cannula lumen,

said stylet having a sharpened distal tip which extends distally from the distal end of said cannula,

said orifice retaining said knob so that force may be rotatably applied around either axis of direction of said elongated stylet positioned in said orifice without relative rotation between elongated stylet and said elongated cannula,

a connector attachment having a knob affixed to its proximal end, said knob being sized to fit matingly within said orifice,

said connector attachment having a shaft affixed to its proximal end, said knob and shaft being sized to fit within said orifice of cannula handle distally and said knob sized to fit an electric drill or electric screw driver proximally,

said orifice retaining said knob of said connector attachment so that force maybe rotatably applied around either axis direction of said elongated connector attachment positioned in said orifice without relative rotation between elongated connector attachment and aid elongated cannula,

an electric drill or electric screw driver,

a sheath which is sized to fit around said electric drill or electric screw driver,

said sheath having an opening to receive said electric drill or said electric screw driver,

said opening having a strap or string to enclose said electric drill or said electric screw driver,

a pushrod having a knob affixed to its proximal end, said knob being sized to fit slidably within said orifice,

an elongated shaft extending from said pushrod knob, slidably received within said cannula lumen,

said pushrod having a blunt distal tip which extends distally from the distal end of said cannula.

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